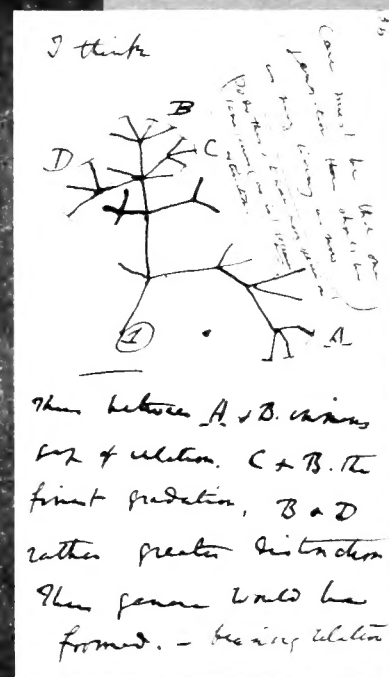
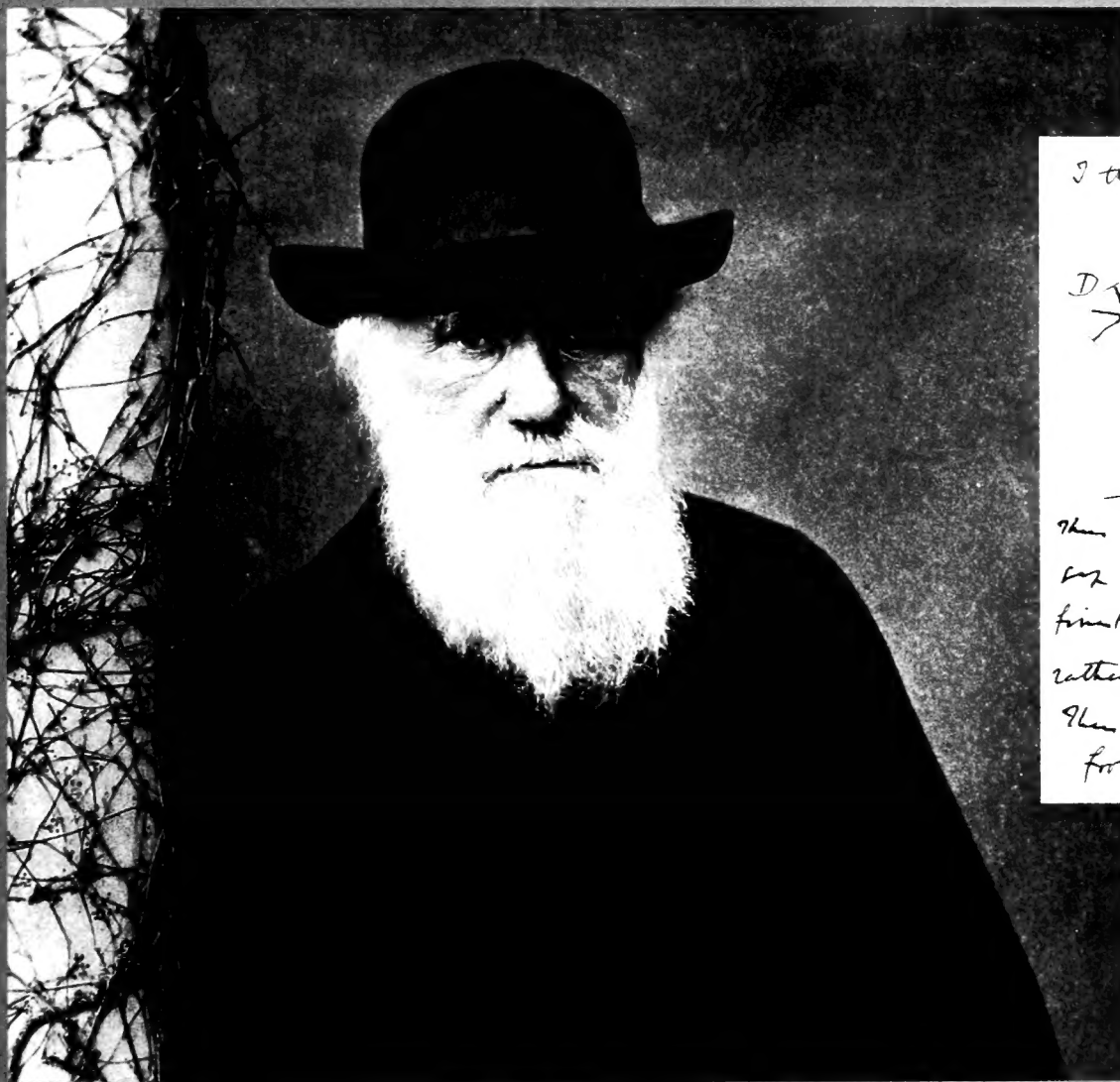


IN THE FIELD

Summer 2007

THE FIELD MUSEUM'S MEMBER PUBLICATION



Darwin Opens June 15

THE EVOLUTION OF EVOLUTION

ASSEMBLING THE TREE OF LIFE

EDITOR:

Nancy O'Shea
The Field Museum

DESIGN:

Bockos Design, Inc.

Printed on recycled paper
using soy-based inks.

All images © The Field Museum
unless otherwise specified.

IN THE FIELD (ISSN #1051-4546)
is published quarterly by The Field
Museum. Annual subscriptions
are \$20; \$10 for schools.

Museum membership includes
IN THE FIELD subscription.
Opinions expressed by authors are
their own and do not necessarily
reflect the policy of The Field
Museum. Notification of address
change should include address
label and should be sent to
the membership department.

POSTMASTER

Send address changes to:
Membership, The Field Museum
1400 South Lake Shore Drive
Chicago, IL 60625-2496
Periodicals postage paid at
Chicago, Illinois, and additional
mailing offices.

COVER, MAIN IMAGE:

Charles Darwin, the subject
of a new exhibition.

© AMERICAN MUSEUM OF NATURAL
HISTORY 326662/ELLIOTT&FRY

COVER, INSET: Darwin's

sketch of an evolutionary tree
of related organisms—the first
illustration of its kind—that
he drew in his "Notebook B"
in 1837. Note the words,
"I think." © BY PERMISSION OF
THE SYDNES OF CAMBRIDGE
UNIVERSITY LIBRARY



DEAN KIRBY/AMNH



JONAH WEINSTEIN/CHICAGO REP



GEORGE F. LAMARCA/UC



JONAH WEINSTEIN/CHICAGO REP

4

Darwin (June 15 through Jan. 1, 2008) is the most in-depth exhibition
ever presented about the scientist whose theory of evolution remains a powerful
explanation for the diversity of life on Earth. *Left: Personal belongings, such as
Darwin's microscope, are shown in the exhibition.*

6

Field Museum zoologist Shannon Hackett, PhD, (*left*) uses DNA analysis
and other high-tech tools to follow in Darwin's footsteps. She is one of many
Museum scientists involved in the *Assembling the Tree of Life* project.

8

The Crown Family PlayLab, scheduled to open in September, is a new
permanent facility where our youngest visitors can learn about nature and
diverse cultures while having fun.

10

Read about the scientists who came before Darwin and helped lay the groundwork
for his ideas. Today, The Field Museum is advancing the study and understanding
of evolution. *Left: Kevin Feldheim, PhD, manager of the Museum's Pritzker
Laboratory for Molecular Systematics and Evolution.*



The Field
Museum

1400 South Lake Shore Drive
Chicago, IL 60605-2496
312.922.9410
www.fieldmuseum.org

The Field Museum salutes
the people of Chicago for their
long-standing, generous support
of the Museum through the
Chicago Park District.

Museum Campus Neighbors

Adler Planetarium June 8 through Aug. 16,
young explorers (ages 3–8) can investigate out-of-this-
world science in *The Zula Patrol: Mission Weather*,
an exhibition that focuses on the Earth's weather.
The new planetarium show, *The Zula Patrol: Under
the Weather*, features the Zula Patrol as it tries to
save the solar system's weather from interplanetary
villains. Visit www.adlerplanetarium.org or call
312.922.7827 for more information.

Shedd Aquarium Enjoy the current *SpongeBob
SquarePants* feature in Phelps Auditorium. The combina-
tion of high-definition digital 3-D projection, high-tech
audio, and "special FX" seats provide breathtaking visuals,
amazing sounds, and lots of other surprises. The other
exclusive engagement, *Lizards and the Komodo King*, stars
an eight-foot Komodo dragon, along with 25 more amazing
lizard species. Visit www.sheddaquarium.org or call
312.939.2438 for more information.

The Essence of The Field Museum


I am very pleased to introduce this edition of *In the Field*, because 2007 is shaping up to be a tremendously exciting year at The Field Museum. I supervise both the legal activities of the Museum and its "external affairs," which in our parlance largely refers to government and community relations.

As an important part of the latter role, I coordinate the Museum's interactions with Native American nations with regard to requests for repatriation of collection materials (sacred objects, etc.). As such, my work is defined by the essence of this institution: The marvelous, multifarious complexity of the Museum's activities, and the great gravity of the Museum's mission. I suspect that it is this essence that appeals to many of you as well.

As you read the pages that follow, I hope that you will find topics that resonate with your personal interests. For example, this year we've opened a remarkable new permanent exhibition, *The Ancient Americas*, and on Sept. 14, we'll open the new, permanent *Crown Family PlayLab* for our youngest visitors (see page 8). We're also presenting an impressive list of temporary exhibitions including *Darwin* (opening June 15), *Dinosaurs: Ancient Fossils, New Discoveries* (through Sept. 3), and *Maps: Finding Our Place in the World* (opening Nov. 2). In addition, we're involved in many high profile activities. For instance, The Field Museum is a co-sponsor of this summer's Cool Globes outdoor art exhibition to raise awareness of global warming (see back cover).

Meanwhile, the Field continues its profound commitments to its research, education, conservation, and outreach missions, with programs that are no doubt familiar to you but which are too numerous to detail here. To me, these are the activities that truly define and distinguish this institution.

Please join us in some of this year's activities—it is by far the best way you can support the Museum—and share in the spirit of exploration and discovery that is at the heart of this institution.


Joseph Brennan
Vice President and General Counsel

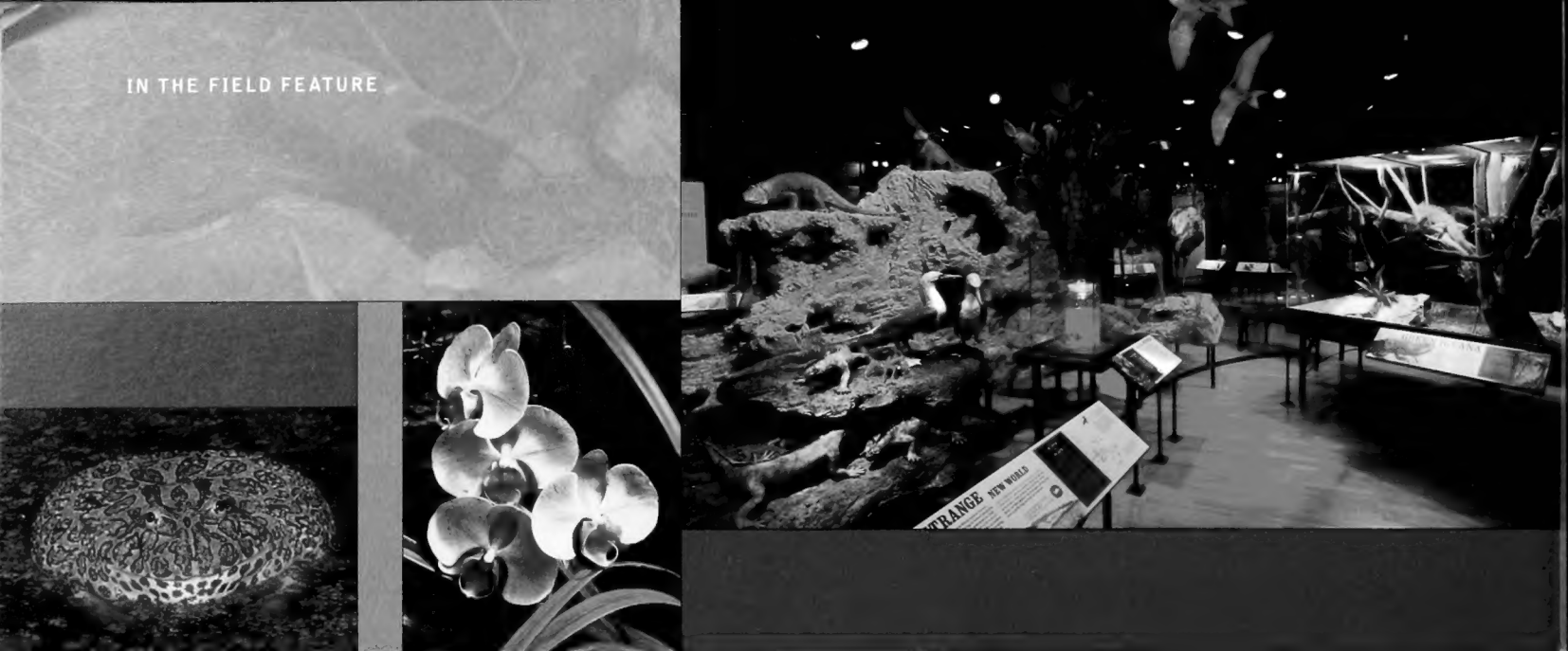
Above: A ceramic mask from Teotihuacan, Mexico, featured in the new permanent exhibition, The Ancient Americas.

A Special Thank You

As with any institution of this size and complexity, we are fortunate to receive diverse and extensive support from government and community groups. In particular, we appreciate the support provided by the Chicago Park District, the City of Chicago, the State of Illinois, Cook County, and numerous private institutions. Let me take this moment to express our thanks; without this support it would be impossible to maintain this institution.



JOHN WEINSTEIN/A114447.01D



Join Darwin on a Voyage of Discovery

New Exhibition Opens June 15

When Charles Darwin stepped aboard the *HMS Beagle* in 1831, he took with him little more than a magnifying glass, a stack of notebooks, and an open mind. For five years, the 22-year-old amateur naturalist collected wildlife, plants, and fossils from South America, Australia, and beyond.

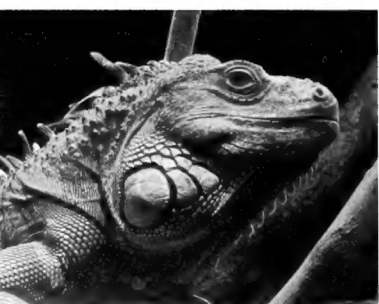
Patiently and in meticulous detail, he pondered the similarities that seemed to link species across time and space. Those insights ultimately led him to conclusions that would change forever how we see ourselves and our living world.

Now Museum visitors can join this ongoing voyage of discovery in a fascinating new exhibition, *Darwin*, (June 15 through Jan. 1, 2008). Through personal belongings and photographs, manuscripts and letters, and hundreds of scientific specimens—including live horned frogs, a green iguana, and delicate orchids—the exhibition sheds light on Darwin's personal life and times, his historic trip around the world, the dramatic development of his scientific theory, and the ways it shapes our lives today.

Voyage Around the World

Darwin called his five-year voyage “by far the most important event in my life.” A scale replica of the *Beagle* will help visitors imagine themselves aboard the ship with him. And they’ll see what an earthquake in Chile and a trek in the Andes taught the budding scientist about the expanse and the power of geological time.

Fossils played an important role in Darwin’s thinking, and visitors will see many here, including a touchable replica of the giant, armadillo-like glyptodont. Why, Darwin wondered, did extinct species disappear, to be replaced by similar species? The famous “Darwin finches” of the Galapagos Islands are here, along with the mockingbirds that first aroused Darwin’s curiosity about the peculiar distribution of species on the islands.



© DENIS FINNIN/AMNH

Top, left to right: The exhibition features live horned frogs and live orchids similar to those Darwin observed. A section of Darwin explores his findings in the Galapagos Islands.

Above: Darwin visitors will see a live green iguana.

Voyage of the Mind

Back in London, Darwin began another voyage—this one inside his mind. He began to realize that species of plants and animals are not static but change over time, and that all species are related through common ancestry. Visitors can see a replica of the first of these notebooks, open to Darwin's sketch of a simple evolutionary tree accompanied by the words: "I think."

It would be many years, though, before Darwin made his thoughts public. "Darwin came back from his voyage knowing he was working on a staunchly materialistic theory," says Olivier Rieppel, PhD, chair of the Field's Geology Department, curator of fossil amphibians and reptiles, and a member of the exhibition's organizing team. "But he was embedded in a culture that was very opposed to this, and he knew it would cause an uproar. So he held his theory back until he had a very strong case."

That case became much stronger when Darwin read Thomas Malthus and realized that more animals were born than could survive: life was a constant competition for survival. Any animal with a competitive edge was likely to live longer and leave more offspring, passing on the trait to the next generation. Darwin sketched out these ideas as early as 1842. In 1844, after he and his family had moved to Down House, in a village outside London, Darwin wrote an essay on evolution by natural selection. Even then, though, he hid the manuscript under the stairs, with instructions to publish it after his death. Darwin lived and worked at Down House for 40 years. The exhibition recreates his cozy study with real artifacts, including his work table, notebooks, and scientific tools.

It was at Down House that Darwin was shocked to receive a letter from a young naturalist, Alfred Russel Wallace, describing a theory remarkably similar to his own. The two men agreed to have their papers presented together at the Linnaean Society in 1858, and Darwin finally rushed his book, *On the Origin of Species*, into print the following year.

Right: "Annie's box"—items that belonged to Darwin's daughter who died at the age of 10.

Bottom, left: A reproduction of Darwin's study.

Bottom, right: A cartoon from 1832 showing Darwin riding a beetle.



© CRAIG CHESK/AMNH

Darwin the Family Man

The exhibition also reveals Darwin's personal life. Visitors get an intimate view of his courtship of Emma Wedgwood, through letters that reveal their mutual love and admiration. Later, Emma would worry greatly that Charles's beliefs would prevent them from being together after death, and Charles would grieve at causing her such pain.

A particularly poignant item is a small writing box. The quill pens and writing paper it holds, along with a bookmark, thimble, thread, and other keepsakes, belonged to Anne, the second of the 10 Darwin children. She died of tuberculosis at the age of 10; Darwin never completely recovered from the loss.

Darwin's Legacy

When Darwin proposed his explanation for the diversity of life on earth, he had no idea how traits were passed along from one generation to the next, or how variations might arise. It's remarkable that his explanation continues to hold up under the light of modern genetics and molecular biology. Contemporary scientists, while continually refining Darwin's theory, still find his work fundamental to their own, whether they are fighting swiftly changing viruses, decoding DNA, analyzing the fossil record, or working to save endangered species.

At The Field Museum, many scientists are engaged in determining the evolutionary relatedness among various groups of plants and animals, both living and extinct. "Several of us are involved in a big, international effort to reconstruct the tree of life," notes Dr. Rieppel. The National Science Foundation is supporting the effort, which will yield untold benefits in agriculture, human health, ecology, and much more—the continuing legacy of Charles Darwin. (Read more about the *Assembling the Tree of Life* project on page 6.) **ITF**

Darwin is organized by the American Museum of Natural History, New York in collaboration with The Field Museum, Chicago; the Museum of Science, Boston; the Royal Ontario Museum, Toronto, Canada; and the Natural History Museum, London, United Kingdom.



© DENIS FINNIN/AMNH

© BY PERMISSION OF THE SYNDICS OF CAMBRIDGE UNIVERSITY LIBRARY

Studying the Results of the Evolutionary Process

A Conversation with Shannon Hackett

Field Museum scientists are following in Darwin's footsteps as they conduct groundbreaking research in evolutionary biology. No other institution has more scientists participating in the program, *Assembling the Tree of Life* (ATOL), funded by the National Science Foundation. Field scientists are Principal Investigators on six ATOL projects. Associate Curator Shannon Hackett, PhD, heads the team that is constructing the tree of life for birds. *In the Field* asked her about the project and her research.



JOHN WEINSTEIN/GN90811-48D

Scientists work in the Museum's Pritzker Laboratory for Molecular Systematics and Evolution.

ITF: *What is Assembling the Tree of Life, and why is it important?*

Dr. Hackett: The project involves assembling a family tree for all species that have lived on Earth—past and present. In effect, it's a big genealogy and it's important for the same reasons that we like to study our own family roots: We want to know who we're related to, where our ancestors came from, why we look and act the way we do, what's our medical history, etc. Scientists working on this project are trying to answer the same kinds of questions for the plants and animals they study. We need to understand how species are related to each other in order to interpret the world's biodiversity. Assembling a tree of life is a way of organizing the vast diversity of the natural world. It provides a picture of the evolutionary process of life on Earth.

ITF: *Why are so many Museum scientists involved?*

Dr. Hackett: Because this is what we study, the results of the evolutionary process across all life. This work is fundamentally linked to our collections; our specimens give us the raw material for our studies. Our work on the Tree of Life project also has a predictive value—how an organism will look and act can be predicted by its relatives, its placement on a family tree. For instance, when birds in eastern North America started dying from what became known as West Nile virus in the 1990s, scientists weren't sure what the infectious agent was. So, they sequenced DNA from the virus and placed it in a family tree—only then did they know what the virus was, and knowing what family of virus this one belonged to gave scientists access to a wealth of information from the virus's relatives that they could then apply to this disease. For example, how fast might the virus spread, where might it go, what species might be vulnerable (or resistant), etc.

ITF: *What specifically are you doing for the ATOL project?*

Dr. Hackett: I'm working on a family tree for major lineages of birds, researching what the major lineages are (what species belong to each lineage) and how these lineages are related. Some people might ask: "Why study birds when they've been studied for so many years and their taxonomy has been relatively stable?" That's true, but we still have little understanding of birds' major lineages and their evolution. The development of new technologies, like automated DNA sequencing and computerized imaging of specimens, has revolutionized how we study the tree of life. In the Pritzker Lab, we can now gather larger datasets of the basic building blocks of life (DNA nucleotides) than ever before. Developments in computational biology are also critical to the analysis of these large datasets.

ITF: *On June 15, the Museum will open an exhibition on Charles Darwin. Talk about his influence on scientists such as yourself.*

Dr. Hackett: Every biology major reads Darwin's *On the Origin of Species*. This book that's almost 150 years old is still relevant and read by so many because it details the origins of our thinking with respect to evolution. I also worked on our recent exhibition, *Gregor Mendel: Planting the Seeds of Genetics* [closed April 1, 2007], and it's interesting to compare Darwin and Mendel. Darwin lived a life of privilege, and he experienced immediate recognition for his work. Mendel was an Augustinian friar who died many years before the scientific establishment discovered the importance of his genetics research. However, Mendel's work provides the underlying mechanisms for Darwin's evolutionary theories. An understanding of genetics is necessary in order to understand how evolution happens.



Dr. Shannon Hackett studies the evolutionary history of birds.

'The development of new technologies... has revolutionized how we study the tree of life.'

ITF: *What is the significance of "Darwin's finches"?*

Dr. Hackett: When Darwin traveled to the Galapagos Islands, he observed and collected finches with different size classes of beaks on different islands. He actually didn't research these birds, but his specimens allowed scientists that came after him to recognize the evolutionary dynamics going on in the Galapagos. Different beak sizes allowed birds to exploit different seed for food available on the islands—big beaks can crack hard seeds and slender beaks are better for manipulating smaller seeds. This is a wonderful example of natural selection as envisioned by Darwin.

With a recent publication of a tree of life for Darwin's finches and their relatives, we now know that the finches' beak variability didn't start in the Galapagos, it was present in their relatives and presumably in their ancestors before their arrival on the uninhabited island chain—we can't study the finches in isolation of their relatives. Not every kind of bird that managed to get to the Galapagos has tremendous amounts of beak variation—take a look at mockingbirds in a field guide to the birds of Ecuador and you'll see there's no beak variation. So we need to ask what happened genetically and developmentally that enabled finches to change their morphology. Where do these developmental and genetic changes originate in the finches' family tree? One hundred and fifty years later, Darwin's specimens and these islands still inspire new research questions in evolutionary biology. **ITF**



An illustration of Galapagos finches from a book about Darwin's voyage on the Beagle (see page 14).

Want to Play?

The Crown Family PlayLab Opens in September

By Danny LaBrecque, Crown Family PlayLab Programs Coordinator



The Museum's new, permanent Crown Family PlayLab opens Sept. 14! It's a special place where children can do what comes naturally—exploring, experimenting, and asking questions—as they learn about the natural sciences and diverse cultures.

The Crown Family PlayLab recognizes that play is a critical part of the learning process in young children. It creates a unique and stimulating environment that is specially designed for children ages 2–6, with activities adaptable up to age 10.

Starting on Sept. 14, the Crown Family PlayLab will be open seven days a week, from 8am–4pm. It is open for Field Museum members only 8–9am each day. For more information, please go to www.fieldmuseum.org/education. **ITF**



Calling All Kids!

The Crown Family PlayLab Features These Activities

Illinois Woodland – put on costumes and then hop, jump and soar like your favorite woodland animals.

Pueblo – harvest and grind corn and create a coil pot, while learning what life was like for a child of the ancient Americas.

Art Studio – create a one-of-a-kind work influenced by nature and culture.

Rhythm Section – play real musical instruments from around the world and dance to the beat of different cultures.

Scientists' Lab – sort, group, compare, and magnify real artifacts and specimens.

Dinosaur Field Station – dig dinosaur bones out of their plaster field jackets, sit on eggs in a dinosaur nest, and solve mysteries of the past as you walk in dinosaur footprints.

The Crown Family PlayLab is generously sponsored by the Crown family.



PHOTOS BY GEORGE PAPADAKIS

Children can dress up as woodland animals, and also learn about the ancient Americas—just two of the many Crown Family PlayLab activities.

JUNE-AUGUST

The Field
Museum

program

SUMMER 2007



JOHN WEINSTEIN, © THE FIELD MUSEUM

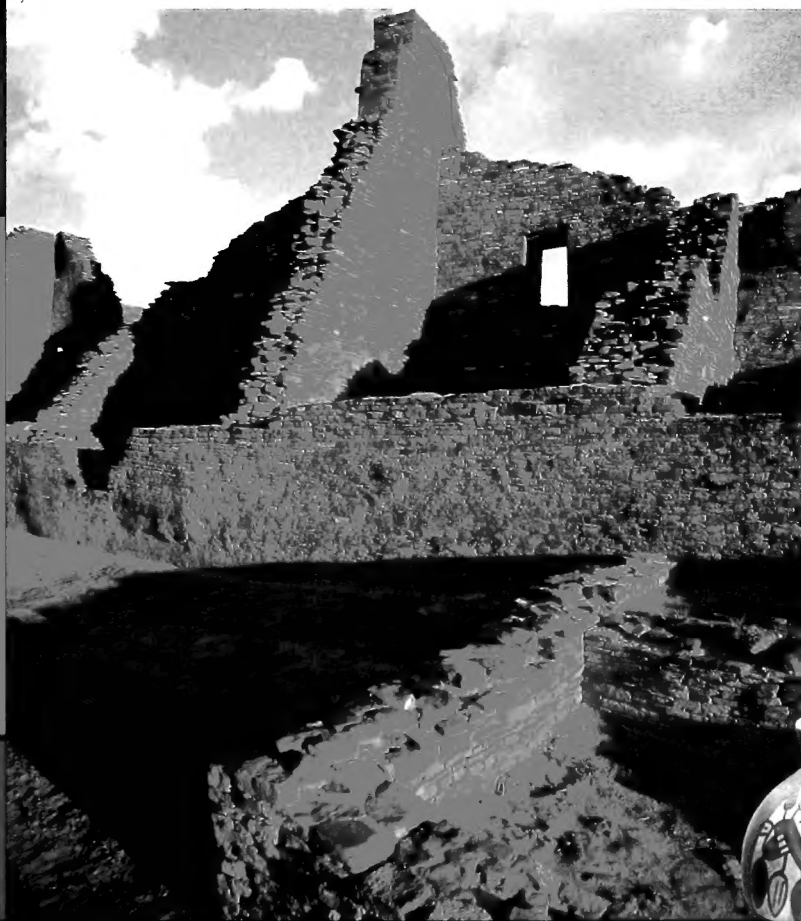
The Ancient Americas Festival Days – FREE!

CELEBRATE OUR NEW PERMANENT EXHIBITION!

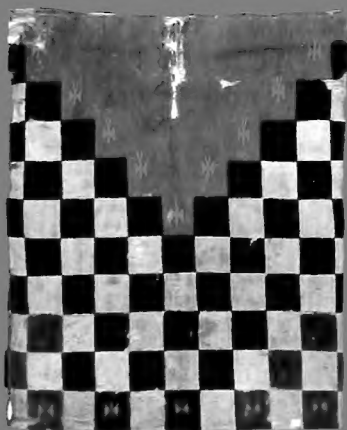
Join us this summer for *The Ancient Americas Festival Days*—an outdoor festival featuring artisans from throughout the Americas, with music, dancing, storytelling, demos, and drop-in activities for families of all ages!

Come see flintknappers and potters, enjoy the performances of One Drum and the American Indian Center, listen to origin stories, create a clay pot, weave a dreamcatcher, and more!

JUNE 30 & JULY 1, JULY 28 & 29, AUGUST 25 & 26, 11am–2pm



BELOW: JOHN WEINSTEIN, © THE FIELD MUSEUM LEFT: GEORGE H. HUEY/CORBIS



JOHN WEINSTEIN, © THE FIELD MUSEUM



THE
ANCIENT
AMERICAS

PROGRAM TICKETS & INFO > 312.665.7400 GENERAL MUSEUM INFO > 312.922.9410 VISIT > www.fieldmuseum.org

Please note: Refunds will be issued by Field Museum staff, minus a \$10 processing fee, for group and family overnights only. Cancellations must be made 24 hours in advance of the overnight in order to receive a refund. No refunds or exchanges are permitted for any other programs. Fees for programs that are cancelled by The Field Museum will be refunded in full.

KRAFT STORY TIME***EVERY SATURDAY & SUNDAY IN JUNE, 1:30pm****DOZIN' WITH THE DINOS Overnight**

Spread your sleeping bag in the middle of some of our most popular exhibitions! For families with children ages 6–12.

JUNE 8 & 15, 5:45pm–9am • \$47, \$40 members**SCIENTIST AT THE FIELD***

Meet a Field Museum scientist and see rarely displayed specimens from our collections.

JUNE 9, 11am–2pm**PUEBLO MEMORIES, ORAL TRADITIONS Lecture**

Learn about the importance of Puebloan communities. Keynote speakers: Dr. Tessie Naranjo, former chair of NAGPRA, and Dr. Sue-Ellen Jacobs, Professor Emeritus from the University of Washington.

JUNE 9, 2pm • \$9, \$8 students/educators, \$5 members

Pre-registration required. Includes general Museum admission.

USDA SCIENTISTS AT THE FIELD**JUNE 14, 11am–2pm**Free with admission to *Underground Adventure*.**DARWIN: DISCOVERING THE TREE OF LIFE Lecture**

Dr. Niles Eldredge, Curator, *Darwin*

Includes a sneak peek at the exhibition!

JUNE 14, 6pm • \$9, \$8 students/educators, \$5 members**ARTISTS AT THE FIELD*****JUNE 16, 11am–2pm****DARWIN DISCOVERY DAYS***

Celebrate the opening of *Darwin* with fun-filled activities for the whole family!

JUNE 16 & 17, 11am–2pm**CHARLES DARWIN—IN PERSON***

A first-person storytelling presentation.

JUNE 16 & 17, 1pm**ANCIENT AMERICAS DAY CAMP New!**

In conjunction with Lookingglass Theatre.

For children ages 11–12.

JUNE 25–29, 12pm–4pm • \$220, \$200 members**ANCIENT AMERICAS FESTIVAL DAYS*****JUNE 30, 11am–2pm****NATIVE AMERICAN STORY TELLERS***

William "Conquering Bear" Buchholtz – Anishinaabe-Ojibwe Nation

JUNE 30, 2:30pm

OF SPECIAL INTEREST

KRAFT STORY TIME*

Bring your little one to The Field Museum to hear a story and make an art project to take home—all in 20 minutes!

DAILY IN JULY, 1:30pm**USDA SCIENTISTS AT THE FIELD**

Visit *Underground Adventure* and get a chance to see and feel different types of soil!

EVERY THURSDAY IN JULY, 11am–2pmFree with admission to *Underground Adventure*.**ANCIENT AMERICAS FESTIVAL DAYS***

A **free** outdoor festival featuring artisans from throughout the Americas, performances, craft demos, and other activities for families of all ages! Hear the origin story of the dreamcatcher as told by the Chippewa and enjoy a noon performance by the Blackhawk Dancers of the Native American Educational Services College.

JULY 1, 11am–2pm**SUMMER WORLDS TOUR 2007 at The Field Museum, The Adler Planetarium, and The Shedd Aquarium**

Discover the amazing diversity that existed among the peoples of *The Ancient Americas*, explore outer space, and uncover the creatures of the deep blue ocean. Four one-week sessions available for children ages 5–10.

JULY 9 – AUGUST 3, 9am–3pm • \$250, \$230 membersRequest a brochure and registration form by calling **312.322.0329**Register online at www.adlerplanetarium.org/education/camps**SCIENTIST AT THE FIELD***

Meet a Field Museum scientist and see rarely displayed specimens from our collections.

JULY 14, 11am–2pm**ARTISTS AT THE FIELD***

Bring your pencils and your brushes and get tips from professional artists throughout the Museum as they draw, paint, and sculpt.

JULY 21, 11am–2pm**NATIVE AMERICAN STORY TELLERS***

The Origins Storytelling summer series highlights the Indigenous voice. Babette Peyton – Seminole/ Iroquois Nations

JULY 28, 2:30pm**ANCIENT AMERICAS FESTIVAL DAYS***

A **free** outdoor festival featuring artisans from throughout the Americas, performances, craft demos, and other activities for families of all ages! Enjoy a demonstration by flintknapper Frank Stevens and a music/dance performance by the American Indian Center.

JULY 28 & 29, 11am–2pm

OF SPECIAL INTEREST

KRAFT STORY TIME*

Bring your little one to The Field Museum to hear a story and make an art project to take home—all in 20 minutes!

DAILY IN AUGUST, 1:30pm

USDA SCIENTISTS AT THE FIELD

Visit *Underground Adventure* and get a chance to see and feel different types of soil!

EVERY THURSDAY IN AUGUST, 11am–2pm

Free with admission to *Underground Adventure*

SCIENTIST AT THE FIELD*

Meet a Field Museum scientist and see rarely displayed specimens from our collections.

AUGUST 11, 11am–2pm

ARTISTS AT THE FIELD*

Bring your pencils and your brushes and get tips from professional artists throughout the Museum as they draw, paint, and sculpt.

AUGUST 18, 11am–2pm



DOZIN' WITH THE DINOS Overnight

Spread your sleeping bag in the middle of some of our most popular exhibitions! For families with children ages 6–12.

AUGUST 18, 5:45pm–9am • \$47, \$40 members



FOSSIL HUNT AT MAZON CREEK Field Trip

Join Dave Dolak from Columbia College at the world-famous Mazon Creek site and discover what Illinois was like more than 300 million years ago! For families with children ages 8–17.

AUGUST 25, 8am–3pm • \$40, \$28 members

NATIVE AMERICAN STORY TELLERS*

The Origins Storytelling summer series highlights the Indigenous voice. Mariel Black Smith – Oglala Sioux of the Lakota Nation

AUGUST 25, 2:30pm

ANCIENT AMERICAS FESTIVAL DAYS*

A **free** outdoor festival featuring artisans from throughout the Americas, performances, craft demos, and other activities for families of all ages! Enjoy a demonstration by flintknapper Jeff Ferguson and have your little one make a flute with their arm, fist, and thumb as they listen to the origin story of this instrument.

AUGUST 25 & 26, 11am–2pm



OF SPECIAL INTEREST

THE ANCIENT AMERICAS

A NEW PERMANENT EXHIBIT

Journey through 13,000 years of human ingenuity from Ice-Age mammoth hunters to the awe-inspiring empires of the Incas and Aztecs.

The Ancient Americas is made possible by the McCormick Tribune Foundation.

Presenting sponsors who have generously supported this exhibition are Mr. and Mrs.

Michael W. Ferro, Jr.; Mr. and Mrs. Miles D. White; Abbott Fund; and ITW Foundation.

Generous support provided by Ernst & Young LLP and LaSalle Bank. Public programs supported in part by the Illinois Humanities Council.



DINOSAURS: ANCIENT FOSSILS, NEW DISCOVERIES

THROUGH SEPTEMBER 3

Dinosaurs with feathers? It's true. What you thought you knew about history takes an unexpected turn in this fascinating exhibition.

Education Program Sponsor: SAP

TREASURES OF THE TITANS Last Days!

THROUGH JUNE 3

Treasures of the Titans features exquisite jewelry and fine accessories associated with iconic figures of the twentieth century such as Elvis Presley and Sophia Loren.

Treasures of the Titans is organized by The National Jewelry Institute.

The exhibition at The Field Museum is made possible through the generous support of The Grainger Foundation.

DARWIN

JUNE 15 THROUGH JANUARY 1, 2008

Discover the man and the revolutionary theory that changed the world.

Darwin is organized by the American Museum of Natural History, New York in collaboration with The Field Museum, Chicago; the Museum of Science, Boston; the Royal Ontario Museum, Toronto, Canada; and the Natural History Museum, London, United Kingdom.



IMPRESSIONS OF TSAVO Last Days!

THROUGH JULY 7

Dazzling color photographs by The Field Museum's own scientists and resident photographer, John Weinstein, reveal the remarkable wildlife, landscape, and people of the Tsavo region in East Africa.

Impressions of Tsavo is organized by The Field Museum.

TRAVELS OF THE CROW: JOURNEY OF AN INDIAN NATION

JULY 2007 THROUGH JULY 2008

A headdress of bison fleece and eagle feathers, shields with powerful symbols—thirteen beautifully made objects portray the hunting and warrior life of the Crow.

This exhibition was organized by The Field Museum.

Story Time and *Native American Story Tellers* are presented by Kraft Foods.

ELLIOT AND FRY © AMERICAN MUSEUM OF NATURAL HISTORY

don't miss these programs!

PUEBLO MEMORIES, ORAL TRADITIONS

Listen as these speakers weave a tapestry of oral history from a long collection of Pueblo memories. You'll learn about the importance of Puebloan communities and the passion with which these women collect their stories. Keynote speakers will be Dr. Tessie Naranjo, former chair of NAGPRA, and Dr. Sue-Ellen Jacobs, Professor Emeritus from the University of Washington.

JUNE 9, 2pm • \$9, \$8 students/educators, \$5 members

Pre-registration required. Includes general Museum admission.

Public programs for The Ancient Americas are supported in part by the Illinois Humanities Council

DARWIN: DISCOVERING THE TREE OF LIFE

Dr. Niles Eldredge, Curator, Darwin

Charles Darwin's ideas resonate deeply in Western culture today and his theories still lie at the heart of modern scientific evolutionary research. Come hear an engaging account of Darwin's life through his writings and discoveries, then enjoy a sneak peek at the exhibition following the lecture.

JUNE 14, 6pm • \$9, \$8 students/educators, \$5 members

ANCIENT AMERICAS DAY CAMP New!

In conjunction with Lookingglass Theatre, The Field Museum is offering 11–12 year olds a chance to spend a week learning about the ancient Americas through a fun week of programs, games, and activities!

JUNE 25–29, 12pm–4pm • \$220, \$200 members

visitor information

GETTING HERE: Field Museum visitors can park in Soldier Field's parking garage.

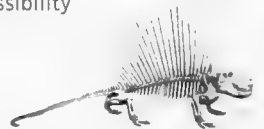
Visit www.fieldmuseum.org for information on parking lots/rates, and public transit.

HOURS: 9am–5pm daily. Last admission at 4pm. Hours are subject to change.

ADMISSION AND TICKETS: Member passes can be reserved through the membership department (312.665.7705) or picked up at the membership services desk. For non-members, The Field Museum's gold pass, which includes general admission plus one special exhibition, ranges in price from \$8 to \$19, depending on your age and whether you are a Chicago resident. Please bring your ID to receive the appropriate ticket price. Tickets are available at the Museum's admission desks, or in advance via www.fieldmuseum.org or **866.FIELD.03**. For admission and ticket details, visit www.fieldmuseum.org.

ACCESSIBILITY: Visitors using wheelchairs or strollers may be dropped off at the new East entrance or at the West entrance. Call 312.665.7400 to check on the accessibility of programs that take place outside of the Museum.

INFORMATION: 312.922.9410 or www.fieldmuseum.org

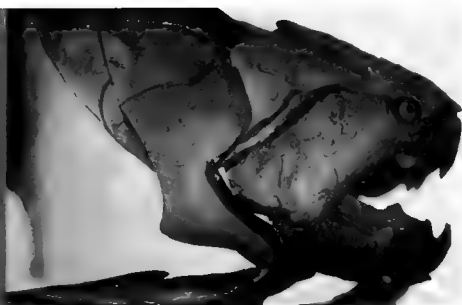


The people of Chicago for their long-standing, generous support of the Museum through the Chicago Park District. In addition, Museum programs are partially supported by a CityArts Program 4 Grant from the City of Chicago Department of Cultural Affairs and the Illinois Arts Council, a state agency.

Under the Federal Education Amendments Act of 1972, we do not discriminate on the basis of sex in our programs or activities. Please call 312.665.7271 to contact the Department of Cultural Affairs. If you are a person with a disability, please contact the Department should you have any questions or concerns.

Ancient Fish with a Deadly Bite

It could bite a shark in two. It might have been the first “king of the beasts.” And it could teach scientists a lot about humans, because it is in the sister group of all jawed vertebrates.



MICHAEL LABABERA



GLOBE/SCIENCE PHOTO LIBRARY

Top: A fossil of *Dunkleosteus* in the Museum's *Evolving Planet* exhibition.

Bottom: Artist Karen Carr's rendering of the ancient fish.

Dunkleosteus terrelli lived 400 million years ago, grew up to 33 feet long and weighed up to four tons. Scientists knew for years that it was a dominant predator, but research has revealed that this predator's bite was remarkably powerful—focusing the bite force into a small area, the fang tip, at an incredible force of 8,000 pounds per square inch!

Even more surprising is the fact that this fish could also open its mouth very quickly—in one in just one-fiftieth of a second—creating a strong suction force that pulled fast-moving prey into its mouth. Usually a fish has either a powerful bite or a fast bite, but not both. This combination

of traits made *Dunkleosteus* one of the first true apex predators. The extinct fish had the strongest bite of any fish ever, and one of the strongest bites of any animal, rivaling the bites of large alligators and *Tyrannosaurus rex*. The bladed jaws, capable of ripping apart prey larger than its mouth, is a feature sharks didn't develop until 100 million years later.

To determine the bite force, researchers used the skull of a *Dunkleosteus terrelli* fossil to recreate the musculature of the ancient fish. (That fossil, shown at left, is on display at The Field Museum's permanent exhibition, *Evolving Planet*.) Scientists constructed a biomechanical model that revealed the jaw's force and motion, and showed that the animal had a highly kinetic skull driven by a unique mechanism based on

four rotational joints working in harmony. Thus, *Dunkleosteus* was able to feast on armored aquatic animals, including sharks, arthropods, and others protected by cuticle, calcium carbonate, or dermal bone. **ITF**

Mark Westneat, PhD, (below) curator of fishes at The Field Museum, co-authored a paper on *Dunkleosteus terrelli* that was published last year in the *Royal Society journal*, *Biology Letters*. He chose this *Scientist's Pick*.



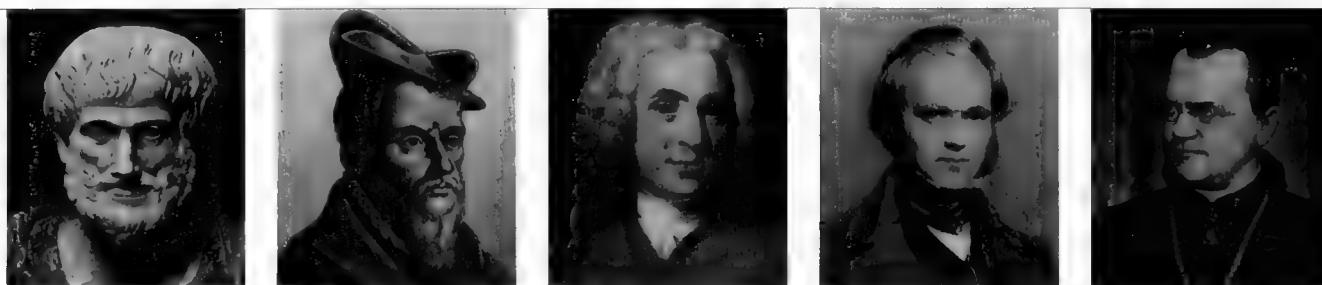
JOHN WEINSTEIN/GETTY IMAGES

The Evolution of Evolution

And the Museum's Role in Evolutionary Studies

By Lance Grande, PhD, Senior Vice President and Head of Collections and Research

The study of evolution, a cornerstone of the Museum's mission, has itself evolved over time, and continues to do so. Although Charles Darwin is often equated with the theory of evolution and has become its main icon, he was actually more of a link (albeit an important link) in a much longer chain of discovery, changing philosophy, and developing theory.

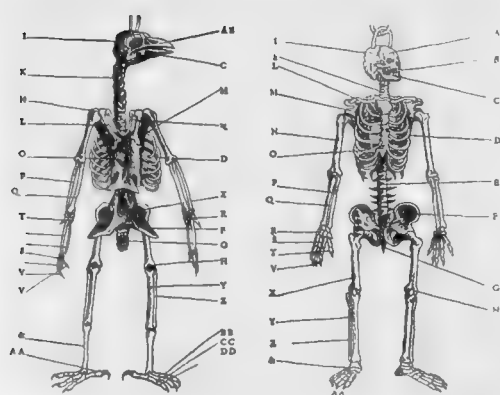


Scientists who have influenced the study of evolution, from left to right: Aristotle, Pierre Belon, Carolus Linnaeus, Charles Darwin, and Gregor Mendel.

Early Scientists

Elements critical to evolutionary theory date back more than 2,000 years before Darwin's birth. Aristotle (322–284 BC) the Greek philosopher and naturalist, is also known as the Father of Comparative Anatomy. He was the first to note that whales belonged with mammals rather than ray-finned fishes. Most people in Aristotle's day equated whales with fishes because they swim in the sea and have "fins." But Aristotle concluded, based on detailed anatomy, that whales formed a natural group with mammals. He was an early developer of the *comparative technique*, which later became an underlying base for all evolutionary research.

Primary homology is another pre-Darwinian concept key to modern evolutionary research. One of the first scientists to clearly illustrate this concept was Pierre Belon (1517–1564), a French naturalist who, in 1555, published an illustration of a bird and a human skeleton mounted side-by-side, with identifications of the same (homologous) bones shared by both. In order to compare the humerus of a human with the humerus of a bird, for instance, researchers first must establish that the homologous element is present in both the human and the bird. In other words, researchers must establish a degree of sameness before they can evaluate the evolutionary importance of differences. The implication of *sameness with differences* lays the foundation for the collection of character data scientists use for evolutionary analyses.



Pierre Belon was the first to publish an illustration demonstrating the concept of primary homology, illustrated by these drawings of a bird skeleton (left) and a human skeleton (right) showing bones shared by both.

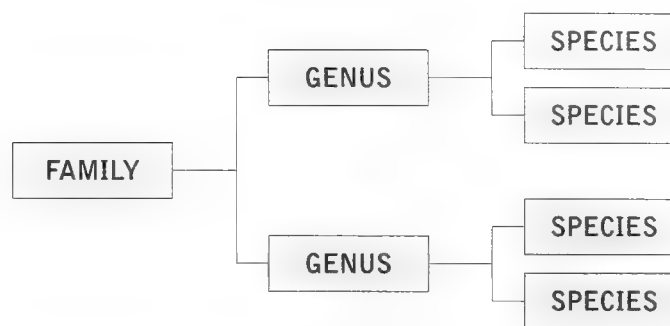
IMAGES ABOVE: DARWIN COURTESY OF THE DARWIN HEIRLOOMS TRUST
 © ENGLISH HERITAGE PHOTO LIBRARY, MENDEL © STEPAN BARTOS

Carolus Linnaeus (1707–1778) was another prominent figure in the development of evolutionary theory and practice. A Swedish botanist, physician, economist, and theologian, Linnaeus is considered the Father of Taxonomy (the method of naming groups of organisms). In 1758, he started the hierarchical convention—still used today—of naming species and higher taxa (groups of related species). His system of naming formed an increasingly inclusive hierarchy, resulting in a pattern of sets nested within larger sets. He grouped species by Genus, grouped genera by Family, grouped families by Order, etc. Even though Linnaeus himself was a creationist, his hierarchical naming system was recognized by others as a natural reflection of evolutionary interconnections. In 1837, a year after returning from his five-year voyage on the *Beagle*, Charles Darwin sketched his first evolutionary “tree” by drawing lines to connect the nested taxa (see cover photo of page from Darwin’s “Notebook B”). It was clear to Darwin that patterns formed by the Linnean system were the natural consequence of the connection of all species through ancestral-descendant relationships.

Darwin and Mendel

Darwin (1809–1882) was an English naturalist who is best known for writing *On the Origin of Species* (1859), the most famous book ever published on the theory of evolution. Darwin’s novel contribution to the concept of evolution was his idea of *natural selection*. The idea contends that of all offspring born each generation in nature, those best able to survive, on average, will be the ones to most successfully reproduce and leave the most offspring to the next generation, which over time gives their lineages an edge in the competition for existence. (Read more about Darwin on page 4.)

Just as there were many pre-Darwinian scientists instrumental in shaping our modern-day notions of evolution, many since Darwin have continued to shape the concept. Gregor Mendel (1822–1884) was one such person. Mendel was



‘Many Museum exhibitions and programs reflect our commitment to the understanding of evolution.’

a teacher, mathematician, Augustinian friar, evolutionist, and today is considered the Father of Genetics. At his abbey, he raised peas and observed the inheritance of physical traits from generation to generation. He used mathematic equations to develop a new explanation for the mechanism of heredity: what we now call *genes*.

Darwin had no knowledge of genes or their behavior. In *On the Origin of Species* he stated, “The laws governing inheritance are quite unknown.” Mendel provided the missing piece on inheritance to Darwin’s theory of natural selection. The eventual merging of Mendel’s explanation of heredity with Darwin’s theory of natural selection in the 20th century resulted in *neo-Darwinism*, or Darwinism as we understand it today. Unfortunately, as often happens in science, the importance of Mendel’s discovery was not realized until much later, long after both he and Darwin were dead.

The concept of evolution continues to develop with the discovery of new methods and techniques such as computer analytical programs and molecular analysis. It also continues to develop through the work of researchers such as James Watson, Francis Crick, and Rosalind Franklin—the discoverers of DNA molecular structure—as well as researchers here at The Field Museum.

Above: The hierarchical classification system of Linnaeus is easily transformed into an evolutionary tree of species.

Field Museum Research

Today, evolutionary studies are a primary area of cutting-edge research at The Field Museum. Museum curators take a leading role in evolutionary research on fishes, amphibians, reptiles, insects, spiders, fungi, lichens, birds, mammals, dinosaurs, flowering plants, and even humans. More than two-thirds of the Field's curatorial staff is focused on some type of original research on biological evolution. And, like fundamental discoveries of the past, the importance of the original work being done today may not be fully realized for decades; often it is the slow-to-be-appreciated contributions that have the longest-standing value to science.

As a leading natural history museum, The Field Museum's mission and responsibility is to look for natural explanations for complex phenomena (such as modern-day biodiversity) using vast collections and scientific methods. But today there are still challenges even to the idea of evolution itself. One such challenge, Special Creationism, is an explanation of nature based on literal interpretation of Genesis in the Old Testament. Dozens of other metaphysical, faith-based explanations also exist in non-Judeo-Christian religions. The Field takes no stand and gives no advice or counsel with regard to religion because that is not its job as a natural history museum. The Museum is not against people of faith by any means; many of our scientists and other staff members have strong religious convictions. But as a natural history institution charged with specimen-based research in the natural sciences, we look for empirically supported natural historical explanations. During the last several years there has been another metaphysical challenge to evolution—Intelligent Design (considered by many to be Special Creationism in a revised form). Intelligent Design proposes that there are “irreducibly complex” systems such as the human eye, which require the action of an unspecified intelligent designer.

Both Special Creationism and Intelligent Design are non-natural explanations to complex phenomena. The Museum is occasionally asked why we don't include such explanations in our presentations of biological diversity. As stated earlier, providing non-empirical historical explanations for biodiversity is not the job of a natural history museum. There are countless organizations and institutions in the world whose mission lies with faith-based matters, while The Field Museum is one of only a handful of major research-focused natural history museums in the world. Our role is to conduct specimen-based research and look for natural, empirically supported scientific explanations for what we observe in nature. To accept irreducible complexity within science represents giving up or failure. What seems irreducibly complex at one point in history (gravity, orbiting of planets around the sun, the human eye) reduces to something much more understandable at a later point. For instance, in the 1500s Galileo did not accept the dictum that the Sun revolved around the Earth, but proposed the empirically-based natural explanation instead. Modern scientists seek natural explanations for the origin of the biodiversity. Experience tells us that evolutionary biologist Theodosius Dobzhansky (1900–1975) was right in his assertion, “Nothing in Biology makes sense except in the light of evolution.”

Furthermore, there is a real and tangible need for institutions that are charged with the further development of evolution as a concept. Operating within the context of evolutionary theory allows Biology to provide invaluable benefits to society: from a better understanding and organization of Earth's biodiversity, to improving conservation effectiveness; from providing tools for agricultural improvement, to providing controls and direction for effective medical research.

Evolution-Based Exhibitions and Outreach

Many Museum exhibitions and programs reflect our commitment to the understanding of evolution. Over one million people visited the permanent exhibition *Evolving Planet* in just the first 11 months it was open. The exhibition serves as a walk-through textbook on the evolution of Earth and its inhabitants. The Museum will continue to update *Evolving Planet* as new discoveries are made; we recently added the fossil *Tiktaalik*, a Devonian fish with limb bones—an evolutionary “missing link” found by Museum Provost Neil Shubin. The exhibition, *Darwin* (June 15 through Jan. 1, 2008), presents an in-depth look at Darwin’s life as a developing evolutionary biologist; *Dinosaurs: Ancient Fossils, New Discoveries* (through Sept. 3) highlights recent research, including the probable evolutionary link between dinosaurs and birds; and the recently-ended exhibition, *Gregor Mendel: Planting the Seeds of Genetics*, told the story of Mendel and his research. In the future, visitors can expect more high quality exhibitions that explore the concept of evolution.

As an institution of higher learning, the Museum takes its research, training, and outreach roles very seriously. Our Collections and Research Division offers university courses on evolution topics taught by our curators through the University of Chicago, the University of Illinois, and Northwestern University. Museum curators serve as advisors and mentors to graduate and undergraduate students studying evolution.



The Field Museum has a long history of studying evolutionary biology. Above: This 1955 photo shows Philip Hershkovitz, former curator of mammals, with rodent skulls.

Also, our Education Department provides teacher workshops and public lectures on evolution. In addition, we offer a number of on-line programs and activities on evolution-based topics on our website, including a comprehensive *Evolving Planet* website (www.fieldmuseum.org/evolvingplanet).

The Field Museum will continue to be a leader in the area of evolutionary studies into the 21st century. Our vast collections and academic history uniquely position us for this course. Our role in deciphering the history of nature will remain a vital and critical one as long as human society continues to see the importance of knowing where we came from, and how that may affect where we are going. **ITF**

‘More than two-thirds of the Field’s curatorial staff is focused on some type of original research on biological evolution.’

Books and Letters by Charles Darwin Among Museum Library's Rare Books

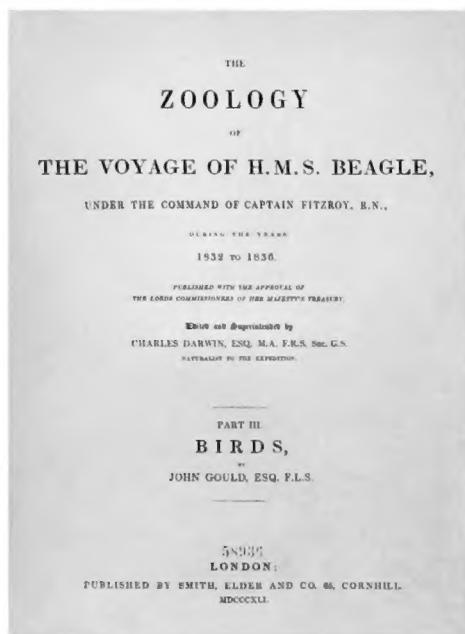
By Michael David Godow, Library Director and Special Collections Manager

Charles Robert Darwin, his findings, theories, and publications continue to be the topic of discourse 125 years after his death. Hundreds of books have been written (and no doubt will continue to be written) about his life and his impact on science and society.

However, to truly understand the man and his theories, a reader should refer to the works that he published during his lifetime. Darwin authored, edited, or published numerous books, articles, and letters.



JOHN WEINSTEIN/GN90929.150



JOHN WEINSTEIN/GN90929.290

Top: Michael D. Godow, the Museum's library director, holds a book that describes the zoological collections gathered during Darwin's voyage on the H.M.S. Beagle.

Bottom: The book's title page.

According to Darwin scholar and bibliographer R.B. Freeman in *The works of Charles Darwin: an annotated bibliographical handlist*, "Darwin wrote 16 books, or 20 according to how one treats them, and he contributed to a further nine, in four of which his work is long and important. There are also a number of little pieces, pamphlets or single sheets, of which he was the author or to which he gave his name with others. These together make up 42 titles to 1882, the year of his death. There are 166 papers or notes in serials; many of these are brief, but about 30 are important contributions to the publications of learned societies. After his death there are his autobiography, his letters, publications from his manuscripts, and later editions and translations of his already published works."

The Field Museum's Library is fortunate to have many rare and notable examples of Darwin's work in the special collections of the Mary W. Runnells Rare Book Room. Some of these include:

- *The zoology of the voyage of H.M.S. Beagle, under the command of Captain Fitzroy, during the years 1832–1836.* (London, Smith, Elder and Co., 1839–1843). Darwin was general editor for this work which described and illustrated the zoological collections assembled during the five-year voyage of the H.M.S. Beagle. Part III is devoted to birds and includes beautiful hand colored lithographs by John Gould.
- *Journal of researches into the geology and natural history of the various countries visited by H.M.S. Beagle... from 1832 to 1836.* (London, Henry Colburn, 1840. First edition, third issue.) This is the final issue of the first edition, and believed to be the rarest.
- *On the origin of species by means of natural selection, or The preservation of favoured races in the struggle for life.* (London, John Murray, 1859. First edition, first issue.) Freeman states that this is "certainly the most important biological book ever written."

These special Darwin works and others will be on exhibition in the Museum's new T. Kimball and Nancy N. Brooker Gallery opening in October, 2007. **ITF**

'The Field Museum's Library is fortunate to have many rare and notable examples of Darwin's work...'

Darwin Member Preview Thursday, June 14

Join us for a special member viewing of *Darwin*. This special exhibition is the most comprehensive exhibition about Charles Darwin ever assembled. (See story on page 4.) On June 14, member viewing starts at 9am with the last viewing at 8:30pm. Family members are entitled to four free exhibition tickets, Individual and Senior Members are entitled to two and Student Members are entitled to one. To reserve your spot, call the membership call center weekdays from 8:30am until 4:30pm at 312.665.7705.

Exercise Your Member Benefits!

Next time you visit The Field Museum, don't forget to stop in one of our Museum Stores to enjoy 10 percent off your purchase.

Planning a summer trip? Field Museum members get free reciprocal admission to more than 200 science and technology museums nation wide. Please visit www.fieldmuseum.org/members to download a complete list of participating institutions.

Museum members enjoy discounts on all education programs such as lectures, courses, and family programs. Check our program calendar in this issue for details!

Founders' Council and Annual Fund News

The Ancient Americas exhibition has been an amazing success since its opening in March! Your continued commitment makes our Field Museum dreams a reality and we thank you.

Mark your calendars! On June 13, don't miss the Annual Fund opening event for our new temporary exhibition, *Darwin*. Also, be sure to see *Dinosaurs: Ancient Fossils, New Discoveries* (through Sept. 3).

Once again our Annual Fund Field Explorer and Field Naturalist behind-the-scenes tours in the spring were an overwhelming success. This summer, look for news about additional behind-the-scenes events in September, October, and November. Priority reservations will be given to those who were unable to attend the spring tours. For more information on The Annual Fund, please call 312.665.7777 or visit us online at www.fieldmuseum.org/annualfund.

Our summer Founders' Council Loop Luncheon is scheduled for Thursday, Aug. 9. Also, watch for more information regarding a private, exclusive *Darwin* preview in June. For more information about these events and The Founders' Council please contact Erica Lee at 312.665.7773.

We hope you take advantage of your many benefits as Annual Fund and Founders' Council donors. We look forward to seeing you soon!



Above: Visitors get a close-up look at a green iguana on display in *Darwin*, opening to the public on June 15.

Right: A model of Mei long, a bird-like dinosaur, is featured in *Dinosaurs: Ancient Fossils, New Discoveries* (through Sept. 3).

©RODERICK MICKENS, AMNH

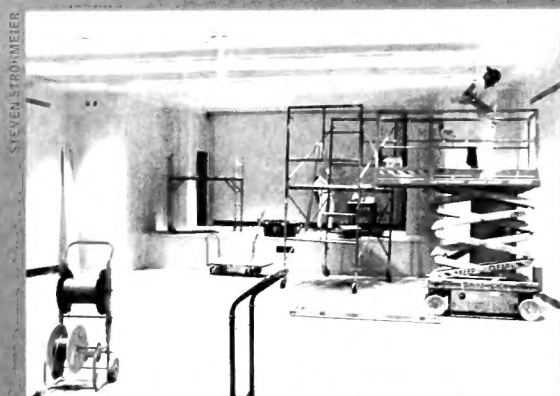
©DAIG CHESSE, AMNH



Ward Lecture Hall Renovation

In 1977, The Field Museum opened the A. Montgomery Ward Lecture Hall to bring thought provoking scientific and cultural programming to the public. Over the years, the Ward Lecture Hall has hosted 5,000 programs on topics ranging from Tibetan art, to Illinois birds, to Amazon cultures. It is also a popular setting for conferences, student classes, teacher professional development programs, visitor orientations, and special events.

Last winter, in partnership with the A. Montgomery Ward Foundation and the Elizabeth Morse Charitable Trust, the Museum launched a major renovation of the Ward Lecture Hall to ensure this important space effectively serves our visitors for decades to come. The revitalized Ward Lecture Hall will include new seats, lighting and carpet, as well as a modern audio/visual system to support innovative, multimedia presentations, symposia, and conferences.



The Ward Lecture Hall will reopen this summer to mark its 30th anniversary. For more information, please contact the Museum's Special Events Department at 312.665.7600.

The renovation of A. Montgomery Ward Lecture Hall

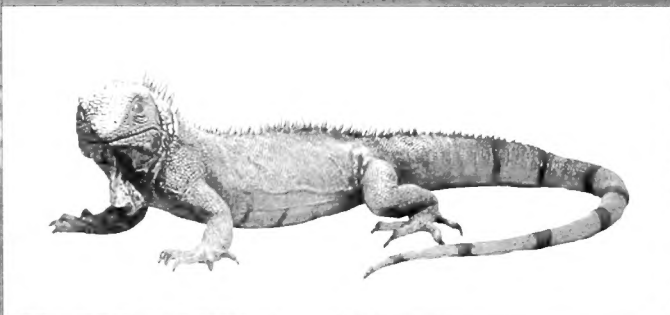
Cool Globes

The Field Museum is pleased to partner with Cool Globes this summer to present *Hot Ideas for a Cooler Planet*, continuing our 115-year commitment to conservation efforts. The lakefront exhibition will showcase more than 100 globes, each addressing a specific solution to global warming. For more information, go to www.coolglobes.com.

In conjunction with the Cool Globes project, The Field Museum will provide screenings of the award-winning documentary *An Inconvenient Truth*, an inspirational look at former Vice President Al Gore's crusade to halt global warming. Screenings will be at 1pm on June 1, 2, and 3, and are free with general admission.

Museum Store Offers Darwin Items

Visitors to the Darwin exhibition will want to shop our display of exhibition-inspired merchandise located both in the Main Store and at the Darwin exhibition exit. Feature items include beautiful home décor pieces inspired by the recreation of Charles Darwin's study, a detailed scale model of his ship, the HMS Beagle, and toys galore including our life-sized green iguana. And remember, shopping is available online 24 hours a day at www.fieldmuseum.org.



This life-sized green iguana toy is available from our Museum Stores.

The Field Museum

1400 South Lake Shore Drive
Chicago, IL 60605-2496

WHAT DO YOU THINK ABOUT IN THE FIELD? For questions about the magazine, call 312.665.7115, email noshea@fmnh.org or write Nancy O'Shea, Editor. For general membership inquiries, including address changes, call 866.312.2781.